(a) a Shack cube comprising a beam splitter cube having four optically functional faces, with an optical element having a spherical reference surface secured to one of said four faces and defining a reference arm;

(b) a test arm that is associated with transmission of optical radiation from a source to a sample and through one of the following:

(i) said reference surface, or

(ii) a face of said beam splitter cube adjacent said reference surface and on the opposite side of the beam splitting surface from said reference surface;

(c) a point source of optical radiation whose emissions are incident on a face of said beam splitter cube such that light from said source traverses both said reference arm and said test arm; and

(d) a detector associated with a face of said beam splitter cube adjacent said source and on the opposite side of said beam splitting surface from said source comprising a detector arm, an objective lens associated with said test arm, or both, said method comprising combining a cat's eye-type reflection with said objective lens so that images from said spherical reference surface and from said objective lens are coincident or separated, as desired.

21. The method of Claim 20 wherein a focus-adjustable collimating lens is situated between said beam splitter cube and said objective lens to permit adjustment during assembly of said point source module.

22. A method of using a point source microscope, said point source microscope comprising:

(a) a Shack cube comprising a beam splitter cube having four optically functional faces, with an optical element having a spherical reference surface secured to one of said four faces and defining a reference arm;

(b) a test arm comprising an objective lens that is associated with transmission of optical radiation from a source to a sample and through one of the following:

(i) said reference surface, or

(ii) a face of said beam splitter cube adjacent said reference surface and on the opposite side of said beam splitting surface from said reference surface;

(c) a point source of optical radiation whose emissions are incident on a face of said beam splitter cube such that light from said source traverses both said reference arm and said test arm; and

(d) a detector associated with the face of said beam splitter cube adjacent said source and on the opposite side of said beam splitting surface from said source so as to receive optical radiation that has reflected from both said spherical reference surface and from said sample after passing through said objective lens, said method comprising obtaining information relating to optical datums, mechanical datums, or both.

23. The method of Claim 22 wherein said method comprises simultaneously obtaining three-dimensional coordinate information relating to said optical datums, said mechanical datums, or both.

24. The method of Claim 22 further comprising attaching said point source microscope as a sensor to a measuring apparatus for measuring the relative locations of optical datums, mechanical datums, or both.

25. The method of Claim 24 wherein said point source microscope is attached to said measuring apparatus for measuring the relative locations of said optical datums, said mechanical datums, or both in three spatial coordinate dimensions simultaneously.

26. The method of Claim 24 further comprising computer control of said measuring apparatus to automatically measure a surface of said sample.

27. The method of Claim 24 further comprising (1) placing in a hole either a ball or a ball mounted on a stud and (2) measuring location of said ball to determine location of said hole.

28. The method of Claim 24 further comprising placing a pin in a hole, and measuring location or tilt or both of said pin to determine to determine location or orientation or both of said hole.

29. The method of Claim 24 further comprising placing a cylindrical pin on a part surface to permit measuring height or tilt or both of a part surface when said point source microscope is not normal to said part surface.

30. The method of Claim 24 further comprising setting said point source microscope to a prescribed location and using real time visual or video sensor feedback to adjust position or alignment of a part until satisfactory.

31. The method of Claim 24 further comprising a video marker on a video monitor that receives a signal from said detector to indicate a tolerance zone of acceptable alignment.

32. The method of Claim 24 further comprising attaching said point source microscope to a coordinate measuring apparatus having a probe tip having a radius and specifying said probe tip radius as effectively zero.

33. The method of Claim 24 wherein said sample has one or more aspheric surfaces.

34. The method of Claim 33 further comprising masking said at least one aspheric surface to obtain an image that uses a portion of said surface with sufficiently small variation of radius of curvature.

35. The method of Claim 24 wherein said point source microscope is used to measure quality of an optical component.